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Indian Standard

METHODS FOR QUANTITATIVE CHEMICAL ANALYSIS OF MIXTURES OF POLYOLEFIN FIBRES AND OTHER FIBRES

UDC 677·-16' 494·742-16 : 677 014 6

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00 *January* 1982

AMENDMENT NO. 1 FEBRUARY 1992
TO
IS 9896 : 1981 METHODS FOR QUANTITATIVE CHEMICAL ANALYSIS OF MIXTURES OF POLYOLEFIN FIBRES AND OTHER FIBRES

(This amendment is being issued to remove any ambiguity regarding values of commercial moisture regain of different fibres to be taken into consideration at the time of calculating the test results.)

(*Page* 7, *clause* **8.2.1**) — Substitute the following for the existing clause :

"For the purpose of calculations the commercial moisture regain values for various fibres as specified in IS 13157 : 1991 'Textiles fibres — Commercial moisture regains — Specification' shall be used."

(TXD 5)

Printed at Printograph, New Delhi, Ph 5726847

Indian Standard

METHODS FOR QUANTITATIVE CHEMICAL ANALYSIS OF MIXTURES OF POLYOLEFIN FIBRES AND OTHER FIBRES

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(*Continued on page* 2)

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METHODS FOR QUANTITATIVE CHEMICAL ANALYSIS OF MIXTURES OF POLYOLEFIN FIBRES AND OTHER FIBRES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 14 August 1981, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 Two or more different types of fibres are mixed with one another for producing a variety of textiles Such a mixture may be composed of different types of man-made fibres or different types of natural fibres or both. The composition of mixture of textile fibres is governed by the ultimate use to which the textile materials are to be put.

0.3 Mixtures of textile fibres are being increasingly used for different purposes. The use of different fibres in textile mixture has necessitated the formulation of standard methods for identification and quantitative estimation of fibres in mixtures. For textile technologists as well as the traders and consumers, the quantitative analysis of textile fibres in mixture is of considerable importance.

0.4 Considerable assistance has been taken from ISO 1833-1977 ' Textiles — Binary fibre mixtures — Quantitative chemical analysis ', issued by the International Organization for Standardization (ISO).

0.5 In reporting the result of a test or an analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*

1. SCOPE

1.1 This standard prescribes a method for quantitative chemical analysis of binary mixtures of polyolefin fibres with wool, silk, cotton, viscose, cupro, modal, acetate, triacetate, polyamide, polyester, acrylic and glass fibres.

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*Rules for rounding off numerical values (*revised*).

Note — Before conducting an analysis according to this method, the fibres present in *the mixture should be identified (see IS : 667 - 1981*) and the sample to be analysed* shall be freed from all non-fibrous matter. Dye in the dyed fibres is considered to be *an integral part of the fibre and is not to be removed*

2. PRINCIPLE

2.1 The polyolefin fibre is dissolved from a known dry mass of the mixture with boiling xylene. The residue is collected, washed, dried and weighed; its mass, corrected if necessary, is expressed as a percentage of the dry mass of the mixture The percentage of polyolefin is found by difference.

3. SAMPLING

3.1 The quantity of textile material of definite type and quality delivered to one buyer against one despatch note shall constitute a **lot**.

3.1.1 If the textile material is fibre or yarn and the lot consists of more than 200 kg of fibre or yarn, it shall be divided into sub-lots each weighing 200 kg or less.

3.1.2 Each sub-lot shall be tested separately.

3.2 Sampling for Fibre and Yarn

3.2.1 From a sub-lot 15 increments, each weighing approximately 10 g, shall be taken from different parts and mixed thoroughly This shall constitute a test sample.

3.3 Sampling for Fabrics

3.3.1 The number of pieces to be selected shall be in accordance with Table 1. The pieces thus selected shall constitute a **gross sample**.

TABLE 1 SAMPLE SIZE

Lot Size Pieces (1)	Sample Size Pieces (2)
Up to 100	3
101 to 300	4
301 to 500	5
501 and above	7

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*Methods for identification of textile fibres (*first revision*).

3.3.2 From each piece in the gross sample selected as in **3.3.1**, cut out small portions from at least two different parts weighing about 25 g. The parts selected shall be as representative as possible of the gross sample. In the case of fabrics with a definite repetition in weave pattern, the parts selected shall include all yarns in the complete pattern. Dissect the small portions of fabric thus collected into yarns and mix them thoroughly. This shall constitute a **test sample.**

4. APPARATUS

4.1 Sintered Glass Filter Crucibles — of appropriate size with pore size 90 to 150 microns (porosity 1) and fitted with ground glass stoppers. If stoppers are not available the crucibles should be enclosed in weighing bottles for weighing.

4.2 Ventilated Oven — capable of maintaining a temperature of 105 ± 3°C.

4.3 Conical Flasks — of 200 ml capacity and fitted with glass stoppers.

4.4 Reflux Condenser — (suitable for liquids of high boiling point), fitting the conical flasks.

4.5 Soxhlet Apparatus

4.6 Analytical Balance — of an accuracy of 0·000 2 g.

4.7 Desiccator

5. REAGENTS

5.0 Quality of Reagents — Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070-1977*).

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the test results

5.1 Xylene — distilling between 137 and 139°C (*see* Note).

NOTE — The harmful effects of this reagent should be borne in mind, and full precautions should be taken in its use.

5.2 Light Petroleum — boiling range 40 to 60°C.

6. PREPARATION OF TEST SPECIMEN

6.1 From the sample (*see* **3.2** or **3.3**) after removing size and finishes as recommended in IS : 9068-1979† draw a representative sample weighing

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*Specification for water for general laboratory use (*second revision*).

†Recommended methods for the removal of non-fibrous matter prior to quantitative analysis of fibre mixture.

about 2 to 3 g. Cut the test specimen into pieces of approximately 25 mm length.

7. PROCEDURE

7.1 Take a test specimen weighing about 1 g, from the pretreated sample (*see* **6**). Cut the test specimen into pieces of approximately 10 mm in length. Dry the pieces of the test specimen at 105 ± 3°C for three hours, cool it in a desiccator and determine its oven-dry mass.

7.2 Put all the pieces in the conical flask. Add 100 ml of the xylene per gram of specimen to the flask. Attach the condenser and boil the contents for 3 minutes. Decant the hot liquid through the weighed filter crucible. Repeat this treatment two times more, each time using a fresh 50 ml portion of fresh solvent (*see* Note). Wash the residue remaining in the flask twice with 30 ml of boiling xylene. Cool the flask and wash the residue twice with 75 ml of the light petroleum. After the second wash with light petroleum, filter the residue through the filter crucible and allow it to drain.

NOTE — Preheat the filter crucible through which the xylene is to be filtered.

7.3 Dry the crucible at 105 ± 3°C for one hour. Cool in a desiccator and weigh. Determine the oven-dry mass of the residue.

7.4 Repeat the procedure prescribed in **7.1** to **7.3** with the remaining test specimen(s).

8. CALCULATION

8.1 *Method Based on Dry Mass — Calculate the percentage, by mass, of* polyolefin fibres in each test specimen by the following formula:

$$P = \frac{(W - F)}{W} \times 100$$

where

P = percentage, by mass, of polyolefin fibres in the test specimen on dry-mass basis;

F = oven-dry mass, in g, of the residue (*see* **7.3**); and

W = oven-dry mass, in g, of the test specimen (*see* **7.1**).

8.1.1 Calculate the average of the values obtained as in **8.1**.

8.2 Method Based on Dry Mass with Moisture Allowances — Calculate the percentage, by mass, of polyolefin fibres in the test sample by the following formula:

$$P' = \frac{100 \times A\left(1 + \frac{b}{100}\right)}{A\left(1 + \frac{b}{100}\right) + (100 - A)\left(1 + \frac{a}{100}\right)}$$

where

P' = percentage, by mass, of polyolefin fibres in the test sample on the dry-mass with moisture allowances;

A = average value of percentage of polyolefin fibres in the test sample obtained as in **8.1.1**;

b = the percentage addition, that is the percentage of moisture content of polyolefin fibres, made to the mass of the polyolefin component; and

a = the percentage addition, that is the percentage of moisture content of other component fibres, made to the mass of the component fibres.

8.2.1 The standard moisture regain values shall be as given below:

Fibre	*Standard Moisture Regain* percent
Cotton	8·5
Silk	11·0
Viscose, polynosic	11·0
Modal	11·0
Cuprammonium	11·0
Cellulose acetate	6·5
Wool	13·6
Polyester	0·4
Polyamide	4·5
Acrylic	1·0
Polyolefins	Nil

9. REPORT

9.0 Report shall include the following information:

a) Type of material,

b) Percentage of polyolefin,

c) Method used (**8.1** or **8.2**), and

d) Number of test specimens tested.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Printed at Kapoor Art Press, New Delhi, India